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Analysis of 6 wanderers with dementia of Alzheimer type using 24-hour behavioral observation

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Abstract

Activities of 6 institutionalized patients with dementia of Alzheimer type (DAT) were videotaped for 24 hours. The activity data were classified based on body position (lying down, sitting, standing, walking, changing body position)/locomotion (moving, not moving) categories. The relationship between body position/locomotion and daily activities was also evaluated. "Walking" was divided into "purposeful" and "purposeless," walking and wandering was defined as sustained purposeless walking or purposeless walking with standing. The total duration of wandering during a 24-hour period was approximately 4 hours, of which 1.5 hours consisted of purposeless. In addition, purposeless walking was frequently observed during free time but not during daily activities such as occupational therapy or eating. Characteristic motions/actions during free time were "touching or feeling body parts or objects" or "none." Characteristic motions/actions differed during purposeless and purposeful walking and included "touching or feeling body parts or objects" and "communicating with others," respectively. Wandering was frequently preceded by "touching or feeling body parts or objects." These observations suggest that wandering represents coping behavior to mitigate boredom associated with free time or uneventful daily activities.

Key words

wandering, dementia of Alzheimer type, behavioral observation, concurrent motions/actions, coping behavior

Introduction

Wandering is the most frequent cause of inability to maintain home-care for dementia patients[1]. It is also a major problem in facilities that care for dementia patients, as it is associated with an increased risk of accidents outside the facilities or the risk of fracture due to excess activity[2].

Many studies concerning wandering have been performed. These studies have extracted and analyzed the cognitive or behavioral characteristics of wanderers, showed that wandering was a result of brain dysfunction, attempted to identify causal lesions associated with wandering[3,4], evaluated whether behavioral characteristics would allow the prediction of wandering[5], or attempted to develop effective intervention methods based on behavioral characteristics[6].

In one study, Otsu et al.[7] asked 10 patients with moderate to severe DAT about their objectives and feelings during wandering or its intermissions. They reported that patients wandered both with and without an objective, but that the objectives of wandering could be classified into the following categories: "work," "going home," "interaction," and "physiological." Such reports, however, have been rare. Another study of the behavior of 3 wanderers, conducted via 24-hour videotape

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surveillance, indicated that wandering is related to daily activities at facilities[8].

Thus, although these studies have revealed various findings regarding wandering, our understanding of wandering, which is often observed in patients who are unable to talk[9], remains insufficient.

One reason for our lack of understanding is that systematic studies of wandering have been hampered by the vagueness of its definition. Dawson et al.[10] defined wandering broadly as "frequent (unpredictable) and aimless walking." Algase[11] classified dementia patients into wanderers and non-wanderers using a behavioral checklist and according to nurses' judgment; however, they did not define wandering. Hori[4] defined wandering as hyperpacing, which involved walking 10,000 or more steps a day. Gauthier[12] described a wandering patient as follows: "The patient sets off to tour the house, the neighborhood, or the city without apparent purpose and usually does not return without assistance."

Using the description provided by Gauthier[12], we studied patients who "walked around apparently without specific purpose." We directly observed wanderers to clarify when and how wandering occurs, whether wandering is related to the daily activities of the facility, and what characteristics are present in the motions and actions of wanderers.

Methods

1. Subjects

We requested that the 3 elderly care and health protection facilities/hospitals (recovery wards) that cooperated in this study provide information about patients admitted between July 2002 and March 2004 who: 1) were diagnosed by a psychiatrist with DAT on the basis of the DSM-IV; 2) did not have a walking disorder; and 3) "walked around apparently without specific purpose" almost daily during the previous week. Seven patients fulfilled the selection criteria. All participants include families provided written informed consent. After explaining the intention of this study to the patients and families, 6 patients were selected as subjects.

Table 1 shows patients' characteristics. Patients included 3 men and 3 women aged 72–91 years. Although 4 patients were receiving anti-psychotic

Table 1. Patient characteristics

Patients	1	2	3	4	5	6
Gender	Female	Male	Female	Male	Male	Female
Age (y)	79	80	91	72	92	82
Facility/Hospital	A Roken[1]	A Roken[1]	B Roken[1]	C Recovery ward	C Recovery ward	C Recovery ward
Occupation	Independent retailer	Skilled worker	Housewife	Office worker	Office worker	Housewife
Duration of illness (y)	6	3	6	9	4	4
HDS-R[2] (Time from examination to imaging study)	10 (3 m)	0 (3 m)	11 (2 m)	no data	no data	no data
MMS[3] (Time from examination to imaging study)	no data	no data	no data	9 (5 m)	14 (1 m)	10 (7 m)
ADL[4]	Partial assistance other than during meals	Partial-total assistance	Partial assistance in toileting	Partial-total assistance	Nearly independent	Partial-total assistance
KSPD[5] Cognitive-Adaptive Area (developmental age in y)	2 y	2 y	4 y 3 m	11 m	4 y 2 m	11 m
KSPD[5] Language-Social Area	5 y 5 m	2 y 10 m	4 y 8 m	1 y 6 m	5 y 9 m	3 y

A, B, and C represent different facilities/hospitals; [1]Elderly care and health promotion facility; [2]Revised Hasegawa Dementia Scale; [3]Mini-Mental State Examination; [4]Activities of daily living; [5]Kyoto Scale of Psychological Development
The scores of HDR-R, MMS, and ADL were collected from the patients' charts.

drugs, there were no changes in their prescriptions during the study. Information concerning age, occupational history, course after onset, and ability to handle activities of daily living (ADL) were taken from patients' charts. In addition, patients completed the Revised Hasegawa Dementia Scale, the Mini-Mental State Examination, and the Kyoto Scale of Psychological Development (KSPD) (Table 1). The cognitive function of patients was judged to be at developmental ages ranging from 11 months to 4 years and 3 months.

2. Data collection and analysis

1) Behavioral observation and recording

Each patient's behavior was recorded using a Sony DCR-PC300K digital video camera recorder (Tokyo, Japan) continuously on videotape for 6 hours a day during a 4-day period for a total of 24 hours; timing was designed to avoid overlapping of monitoring periods. The attending nurses and caregivers were interviewed immediately before video-recording to obtain information about the patient. Behavioral observation and video-recording were done by the author on days that the patient was behaving as usual. Video-recording was performed from a distance of 5–10 m, taking care not to disturb the patient's activities. During bathing and toileting, video-recording was continued from outside the bathroom or toilet to protect the patient's privacy. When additional information concerning the state of the patient was considered necessary, a verbal explanation was recorded using an Olympus DM-20 voice recorder (Tokyo, Japan). After video recording, the nurses and caregivers were asked whether the patient's state on that day was typical. Recordings of unusual states were disregarded and the recording was conducted again.

2) Analysis of the relationship between routine activity and body position/locomotion categories

The 24-hour video of each patient was divided into 5-second segments, called units. By reviewing the video-recording, the author judged which of the daily activities and body position/locomotion categories were observed during each unit. Seventeen "daily activities" (Table 2) were used to describe activities that each patient was expected to perform according to the schedule of the facility, including free time. Eight "body position/locomotion" categories (Table 3) were used to describe the body position or locomotion during "purposeful walking" (locomotion by walking seemingly with an objective) or "purposeless walking" (locomotion by walking seemingly without an objective). If changes in the body position were observed during a 5-second unit, they were recorded as "body position changes." Thus, all units in the 24-hour period were defined by 1 of 17 activity categories and 1 of 8 body position/locomotion categories. First, we calculated the proportion of a 24-hour period for which each activity category was performed. Second, the proportion of time each body position/locomotion category was observed was calculated for each activity category. Subsequently, these proportions were used to identify correlations between activity categories and body position/locomotion categories.

3) Motions/actions concurrent with daily activities

Motions/actions observed concurrently with those included in the body position/locomotion categories were named "concurrent motions/actions," and their relationships with daily activity categories were evaluated as described below:

Selection of time segments for analysis of concurrent motions/actions: Due to the large volume of data, analysis of all 24-hour records of all 6 patients was virtually impossible to perform. Therefore, the time spent on each activity category by the 6 patients was calculated, and then the mean time spent on each activity was calculated. Next, analysis was performed by condensing the 24-hour data into 1 representative hour by dividing the mean time spent on each activity by 24. To prevent data loss, any activity times that comprised less than 1% of the 24 hours were regarded as 1% (50 seconds). In order to establish situations in which patients were not presented with a clear target for their motion/action and situations in which staff members intervened and clarified what the patients were required to do, we selected the following activity categories in which concurrent motions/actions would be

Table 2. Definitions and descriptions of daily activities at facilities

Category	Definition	Description
Sleeping	Nighttime hours for sleep arranged by the staff	From the beginning of guiding the patient to bed to calling the patient to wake up, or between the lights-out and lights-on times with no assistance provided
Toileting	Time for toileting	From the beginning of guiding the patient to the toilet area to departure from the toilet area, or from the time when the desire to urinate or defecate is considered to have appeared to departure from the toilet area without assistance
Eating	Time for 3 meals	From serving the meals to clearing the tables
Waiting for meals	Time for guiding the patient to the table for meals and tea	From the beginning of guiding the patient to the table, or from the time when tea was distributed without assistance, to the serving of a meal
Teatime	Time for eating other than meals	From the beginning of guiding the patient to the table, or from the serving of a snack without assistance, to clearing the table
Grooming	Time for washing face, brushing teeth, and combing hair	From the beginning of guiding the patient to each activity to the verbal indication of the end of the activity by the staff, or from the beginning to the end of the activity without assistance
Bathing	Time for bathing	From the beginning of guiding the patient to bathing to the departure from the bath area
Vital checks	Time for body temperature and blood pressure measurements	From the beginning to the end of measurements
Taking drugs	Time for regular medications	From the beginning of assistance by the staff to the end the activity with assistance, or from the beginning to the end of the activity without assistance
Exercise	Time for exercising arranged by the staff	From the beginning of guiding to the announcement of the end of exercising, or from the beginning to the end of the exercise music without assistance
Recreation	Time for recreational activities determined by the staff and the patients' personal hobbies	From the beginning of guiding to the announcement of the end, or from the beginning to the end of participation without assistance
Taking walks	Time for taking walks outside the ward arranged by the staff	From the beginning of guiding to the announcement of the end
Occupational therapy	Time for individualized treatment by an occupational therapist	From the beginning of guiding to the vocal indication of the end by the therapist, or from the beginning to the end of the therapy without assistance
Helping	Time for helping with daily chores selected by the staff such as cleaning or folding laundry	From the beginning of guiding to the vocal indication of the end by the staff, or from the beginning to the end of helping without assistance
Visiting	Time individually arranged for communicating with family, relatives, and friends	From the beginning to the end of the meeting
Free time	Time with no expected activity	
Other	Time of activities not included in the above categories	

Table 3. Definitions of body position/locomotion categories

Category	Definition
Purposeful walking	Locomotion by walking seemingly with an objective
Purposeless walking	Locomotion by walking seemingly without an objective
Standing	Standing with no locomotion
Sitting	Seated with no locomotion
Lying down	Recumbent with no locomotion
Body position change	In the process of changing from one body position to another
Others	States not included in the above categories
Unknown	Judgment of state impossible

analyzed : (1) "free time"; (2)"eating" (a clear target of action was presented to the patient) (3) "exercise," "recreation," "occupational therapy," and "helping"; (no direct target of action were presented, but staff explained what to do if an explanation was required) and (4) "toileting" and "vital checks"; (patients were required to be involved with staff). The selection of activities of interest were based on whether a clear target of patients' motion/action was presented to them and whether staff members intervened to clarify what the patient was meant to do. In terms of "exercise," "recreation," "occupational therapy," and "helping," 2 of these 4 activities were selected for each patient, because these activities varied among the facilities. As a result, the duration of activities condensed to 1/24 were 1,545 seconds for "free time," 145 seconds for "eating," 50 seconds for "exercise," 90 seconds for "recreation," 50 seconds for "occupational therapy," 50 seconds for "helping," 110 seconds for "toileting," and 50 seconds for "vital checks." Starting from the time unit in which the activity was first observed, the units to be analyzed were accumulated until the durations of the activities of interest reached values that represented the actual duration of the activity in a 24-hour period. If the activity was performed over a long time or in 2 or more periods, the time was calculated from 13:00, because morning activities in the institution follow a strict routine.

Classification of concurrent motions/actions. In each unit, we judged what the patient was doing, including walking, by reviewing the video, describing it in detailed sentences, and recording it on a data sheet under the title of the "whole picture of the patient's motions/actions", In addition, we provided detailed written descriptions regarding the motions/actions of others, including other patients, caregivers, and visiting family members, and their circumstances in each unit based on the video and vocal records from the voice recorder; these detailed reports were named "details of motions/actions by others". From the "whole picture of the patient's motions/actions" and "details of motions/actions by others", we determined the "concurrent motions/actions" performed by the patient. Categories of "concurrent motions/actions" were established by collecting and sorting similar concurrent motions/actions. Contents of the categories of concurrent motions/actions were then compared with the activity categories.

4) Analysis of the state immediately before wandering

(1) Definition of wandering: In this study, we defined wandering as "walked around apparently without specific purpose", and considered "purposeless walking," which we designated a body position/locomotion category, to be equivalent to wandering. In reality, however, purposeless walking was often interrupted by short periods of standing. Therefore, "purposeless walking", "purposeless walking" + "standing", and "purposeless walking" + "standing" + "purposeless walking" were all regarded as "wandering," and the body position/locomotion categories corresponding to wandering were selected from the 24-hour records and analyzed.

(2) Extraction and categorization of the states immediately before wandering: In the unit immediately before the one in which the action was judged to be wandering as in (1) above, the "whole picture of the patient's motions/actions" and "details of others' motions/actions" were examined, and recorded using the name of "the state immediately before wandering". Similar motions/actions were then collected and classified based on possible meaning.

(3) Estimation of the background factors of wandering: On the basis of the classification of the state immediately before wandering as described above, the circumstances immediately preceding wandering were analyzed, and the possibility of estimating the background factors of wandering was clarified by identifying factors that occurred repeatedly before wandering occurred.

5) Analysis of concurrent motions/actions performed during walking

After evaluation of the state immediately before

wandering in 4) "Analysis of the state immediately before wandering", we further examined concurrent motions/actions during walking. Concurrent motions/actions observed in the 24-hour records during "purposeful walking" and "purposeless walking" among the body position/locomotion categories were analyzed and classified by collecting and sorting similar concurrent motions/actions. Contents of the categories of concurrent motions/actions were then compared with the activity categories.

Results

1. Patients' physical environment

Patients were all admitted to a closed recovery unit or regular ward, in which all entrances were locked; although they could not freely leave the ward, they could freely move around in it. Many patients spent the daytime hours in the dining rooms or day rooms at all the facilities/hospitals. At each facility/hospital, physicians, nurses, and care workers were regularly employed, and about 10 staff members were on duty during the daytime and 2 during the nighttime. Recreation was provided by care workers at all facilities/hospitals, and Patients 1, 2, and 3 participated in individual occupational therapy or group recreational activities at their elderly care and health protection facilities, which were regularly staffed by an occupational therapist.

2. 24-hour schedule of daily activities

Mean values for all 6 patients showed that 38% of the 24 hours recorded (32,893 seconds, about 9 hours) was spent on sleeping; 14% (12,097 seconds, about 3.4 hours) on basic personal activities such as toileting, eating, waiting for meals, teatime, grooming, and bathing; 0.3% (218 seconds, about 4 minutes) on medical management such as vital checks and taking drugs; 3.8% (3,251 seconds, about 1 hour) on performing roles and hobbies such as exercise, recreation, taking walks, occupational therapy, and helping; 0.7% (619 seconds, about 10 minutes) on visiting; 43% (37,084 seconds, 10.3 hours) was free time; and 0.3% (238 seconds, about 4 minutes) was spent on other activities. No marked difference was observed in this time allotment among the patients, and free time occupied a large percentage of overall time.

3. Percentages of body position/locomotion categories

Figure 1 shows the frequencies of the occurrences of various body position/locomotion categories in

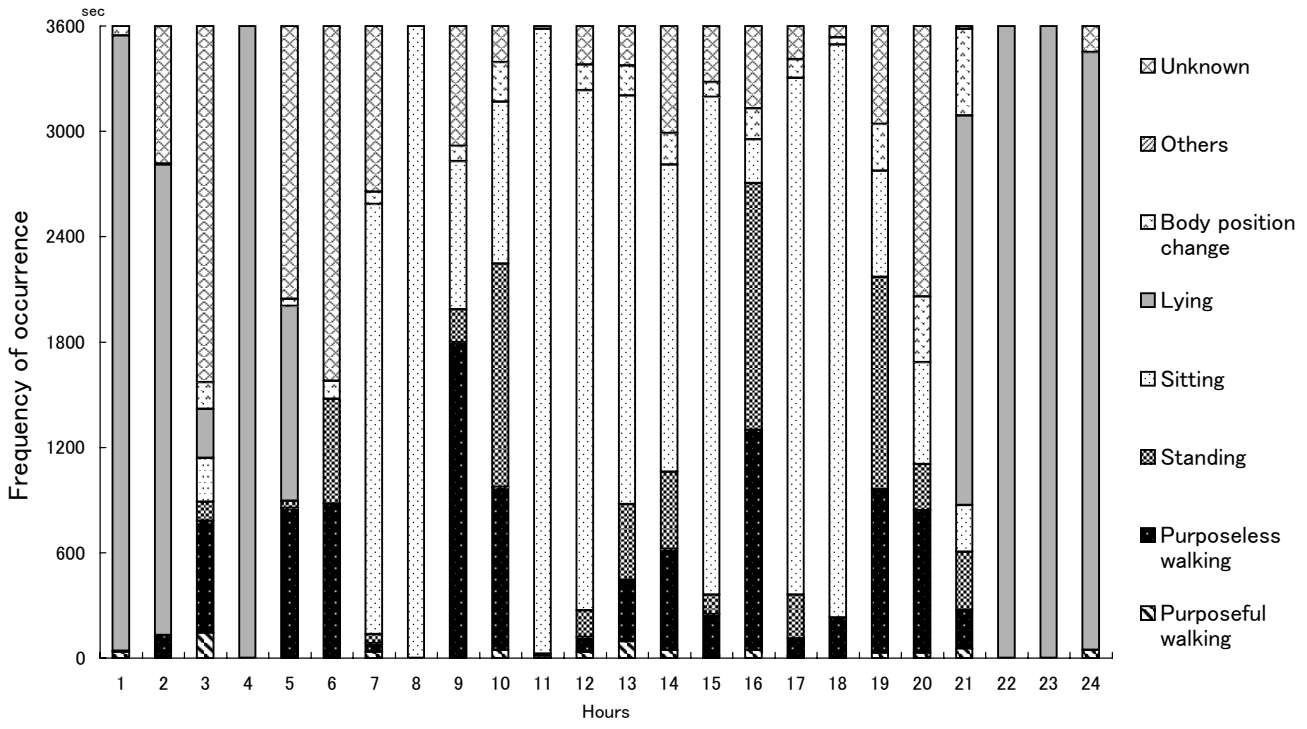

Figure 1. The frequency of occurrence of various body position/locomotion categories in 1-hour periods in Patient 2

Table 4. Mean number of walking periods and mean duration of walking for each patient

Patients	1	2	3	4	5	6	Mean
Time of purposeful walking (sec)/24 hours (a)	765 (35%)	670 (6%)	1775 (38%)	860 (16%)	1075 (21%)	1430 (13%)	1096 (17%)
Time of purposeless walking (sec)/24 hours (b)	1410 (65%)	10075 (94%)	2920 (62%)	4425 (84%)	3960 (79%)	9265 (87%)	5343 (83%)
Total time of walking (sec)/24 hours (a+b)	2175 (100%)	10745 (100%)	4695 (100%)	5285 (100%)	5035 (100%)	10695 (100%)	6438 (100%)
Number of periods of purposeful walking (times)/24 hours (c)	47 (32%)	32 (14%)	79 (37%)	37 (22%)	54 (23%)	49 (10%)	49.7 (20%)
Number of periods of purposeless walking (times)/24 hours (d)	102 (68%)	194 (86%)	133 (63%)	131 (78%)	182 (77%)	441 (90%)	197.2 (80%)
Total number of walking periods/24 hours (c+d)	149 (100%)	226 (100%)	212 (100%)	168 (100%)	236 (100%)	490 (100%)	246.8 (100%)
Mean duration of a period of purposeful walking (sec) (a/c)	16	21	22	23	20	32	22.3
Mean duration of a period of purposeless walking(sec) (b/d)	14	52	22	34	22	21	27.5
Mean duration of a period of walking (sec) (a+b)/(c+d)	15	48	22	31	21	22	26.5

1-hour periods for a representative patient. In all patients, the frequency of lying down was high during the nighttime, whereas that of being seated was high during the daytime, in all patients.

Purposeless walking occurred in all patients during the daytime, but Patient 2 also exhibited it at nighttime. The frequency of the occurrence of purposeless walking and standing varied among patients, and was particularly high in Patients 2 and 6. Patients 4 and 5 tended to frequently engage in purposeless walking in the evening and nighttime, but there was no particular time when it occurred with any frequency in the other patients.

Table 4 shows the total durations and total numbers of purposeful and purposeless walking periods in the 24-hour period and the mean duration of a single period of walking. In terms of purposeless walking, the total duration was 6,438 seconds (01:29:03), the total number of walking periods was 197.2, and the mean duration of 1 walking period for the 6 patients was 27.5 seconds. Purposeless walking accounted for 83% of the total duration of walking. However, individual scores varied widely. In Patients 2 and 6, both the total duration of purposeless walking and its percentage of total walking were high at 10,075 seconds (02:47:55) and 94% and 9,265 seconds (02:34:25) and 87%, respectively, and the mean duration of 1 period of walking was 52 and 21 seconds, respectively. In Patients 1 and 3, the duration of purposeless walking and its percentage of total walking was relatively low, at 1,410 seconds (00:23:30) and 65% and 2,920 seconds (00:48:40) and 62%, respectively, and the mean duration of 1 period of walking was 14 and 22 seconds, respectively.

4. Relationships between daily activities and body position/locomotion categories

Figure 2 shows the percentages of various body position/locomotion categories according to daily activities in each patient. In all patients, sleep occurred mostly during lying down, whereas eating, teatime, vital checks, and recreation were done mostly while seated.

Although the activities during which purposeless walking occurred varied among patients, it was observed during free time in all patients.

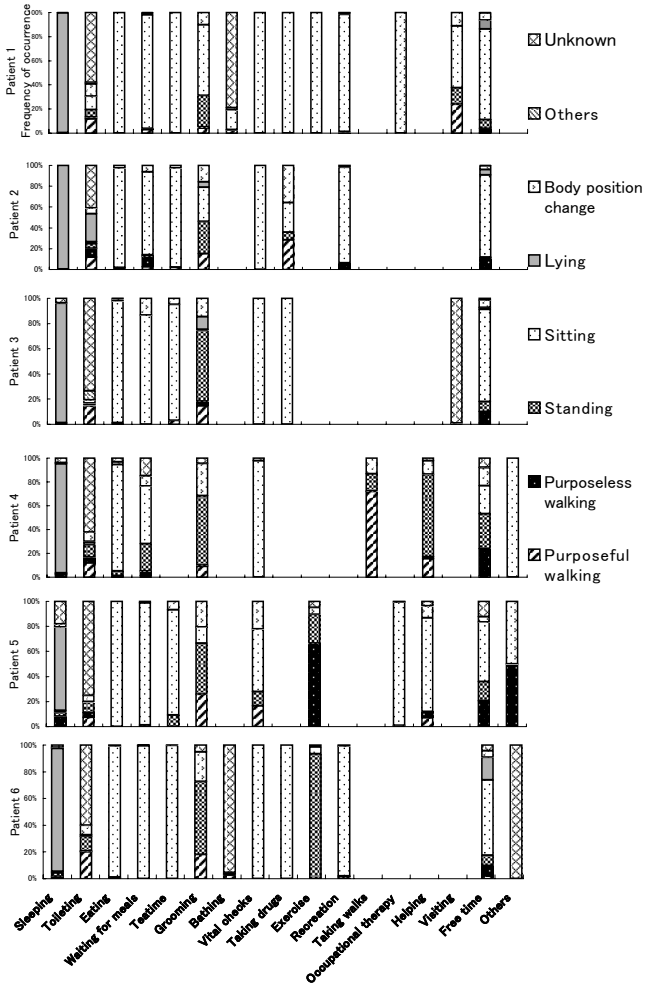

Figure 2. Percentage of various body position / locomotion categories according to daily activities in each patient

Purposeless walking accounted for 3% (Patient 1) to 23% (Patient 6) of free time. Purposeless walking was rarely observed in any of the patients during meals, teatime, vital checks, taking drugs, or occupational therapy. It was observed during toileting in Patients 1, 2, 4, and 6, all of whom were considered incapable of independent toileting. In Patient 2, purposeless walking was observed during sleep, exercise, and "other activities" as well as during free time and toileting. The term "other activities" was used for this patient, because although the patient was in the toilet area when the walking occurred, it could not be confirmed whether toileting activities actually took place. In Patient 4, purposeless walking also occurred while waiting for meals and during recreation in addition to during free time and toileting. In Patient 6, purposeless walking of different durations or frequencies occurred in all activities except during vital checks and other activities. The "other activities" here refers to aromatherapy, during which the patient was in a complete one-to-one situation with a staff member (as during vital checks).

5. Comparison of concurrent motions/actions during daily activities

Concurrent motions/actions during various daily activities were evaluated in each patient. Table 5 shows an example. During free time, the concurrent motions/actions most frequently observed were "touching or feeling the body or objects" in Patients 1, 2, and 5; "none" in Patients 2 and 4; "unknown" in Patient 3; and "communicating with others" in Patient 6. During meals, the most

Table 5. Relationships between daily activities and concurrent motions/actions in Patient 6

Concurrent motion/action	Free time (1545 sec) 13:34:25-14:04:20		Eating time (145 sec) 18:11:25-18:13:35		Toileting time (110 sec) 13:29:15-13:31:05		Helping time (50 sec) 10:08:15-10:09:00		Vital check time (50 sec) 13:02:50-13:03:35	
	Duration (sec)	Percentage of time spent on this action in the activity	Duration (sec)	Percentage of time spent on this action in the activity	Duration (sec)	Percentage of time spent on this action in the activity	Duration (sec)	Percentage of time spent on this action in the activity	Duration (sec)	Percentage of time spent on this action in the activity
Looking outside	112.5	7%	5	3%	0	0%	0	0%	0	0%
Touching or feeling the body or objects	479	31%	10	7%	0	0%	0	0%	20	40%
Performing the assigned task	0	0%	125	87%*	10	9%	40	80%*	0	0%
Muttering	32.5	2%	0	0%	5	5%	0	0%	0	0%
Communicating with others	631	41%*	5	3%	10	9%	10	20%	0	0%
Other	10	1%	0	0%	0	0%	0	0%	0	0%
None	125	8%	0	0%	0	0%	0	0%	30	60%*
Unknown	155	10%	0	0%	85	77%*	0	0%	0	0%
Total duration	1545	100%	145	100%	110	100%	50	100%	50	100%

*Highest among concurrent actions marked in grey

frequent motion/action was "performing the assigned task" in all patients.

Although data concerning occupational therapy and helping could be obtained from only 1 patient in each category, "performing the assigned task" was the most frequent activity during these activities. During recreation, the most frequent concurrent motions/actions were "performing the assigned task" in Patient 1, "communicating with others" in Patient 3, and "none" in Patient 4. During exercise, "touching or feeling the body or objects" occurred most frequently in Patients 1 and 2 and "performing the assigned task" occurred most frequently in Patient 3.

During vital checks, the most frequent concurrent motions/actions were "communicating with others" in Patients 1 and 5 and "none" in Patients 2, 3, 4, and 6.

6. State immediately before wandering

Table 6 shows the frequency and duration of wandering and the state immediately before wandering in each patient. The number of wandering periods ranged from 21 to 75, and the total time spent wandering ranged from 4,780 seconds (01:19:40) to 32,120 seconds (08:55:20), showing wide individual variations with a long maximum duration. One period of wandering ranged from 5 seconds (Patient 6) to 45 seconds (Patient 2) at the minimum and from 450 seconds (00:07:30, Patient 4) to 8,415 seconds (02:20:15, Patient 6) at the maximum. It also varied widely from short to long in each patient.

The most frequent motion/action observed immediately before wandering (Table 6) was "touching or feeling the body or objects" in Patients 1 (47%), 2 (27%), and 6 (22%); "having completed the assigned task" in Patients 3 (27%) and 5 (34%); "being guided by others" in Patient 6 (22%); "looking outside" in Patient 3 (31%); and "none" in Patients 2 (27%) and 4 (81%). "Changes in people and objects around the patient," which we expected to induce wandering, were observed

Table 6. Duration of wandering and percentage of conditions immediately before wandering

Patients		1		2		3		4		5		6	
Total duration of wandering (sec)/24 hours		4780		30190		7895		6350		9595		32120	
Minimum-maximum duration of wandering (sec)		10～675		45～7100		40～1395		10～450		20～1360		5～8415	
Mean duration of wandering (sec)		145		1006		376		85		331		1006	
Percentage of condition immediately before wandering		Number	Percentage of all periods of wandering	Number	Percentage of all periods of wandering	Number	Percentage of all periods of wandering	Number	Percentage of all periods of wandering	Number	Percentage of all periods of wandering	Number	Percentage of all periods of wandering
Condition immediately before wandering	Looking outside	0	0%	0	0%	8	31%*	0	0%	3	10%	0	0%
	Touching or feeling the body or objects	16	47%*	9	27%*	3	12%	2	3%	8	28%	7	22%*
	Having completed the assigned task	8	24%	3	9%	8	31%*	4	5%	10	34%*	3	9%
	Talking to others	3	9%	0	0%	2	8%	0	0%	1	3%	0	0%
	Being guided by others	0	0%	4	12%	1	4%	1	1%	2	7%	7	22%*
	Changes in people or objects around the patient	1	3%	2	6%	2	8%	2	3%	0	0%	4	13%
	Other	0	0%	2	6%	1	4%	3	4%	1	3%	5	16%
	None	6	18%	9	27%*	1	4%	61	81%*	3	10%	6	19%
	Unknown	0	0%	4	12%	0	0%	2	3%	1	3%	0	0%
Total number of wandering periods		34	100%	33 (30 after elimination of duplicated counts)	100%	26 (21 after elimination of duplicated counts)	100%	75	100%	29	100%	32	100%

*Highest among the conditions immediately before wandering marked in grey

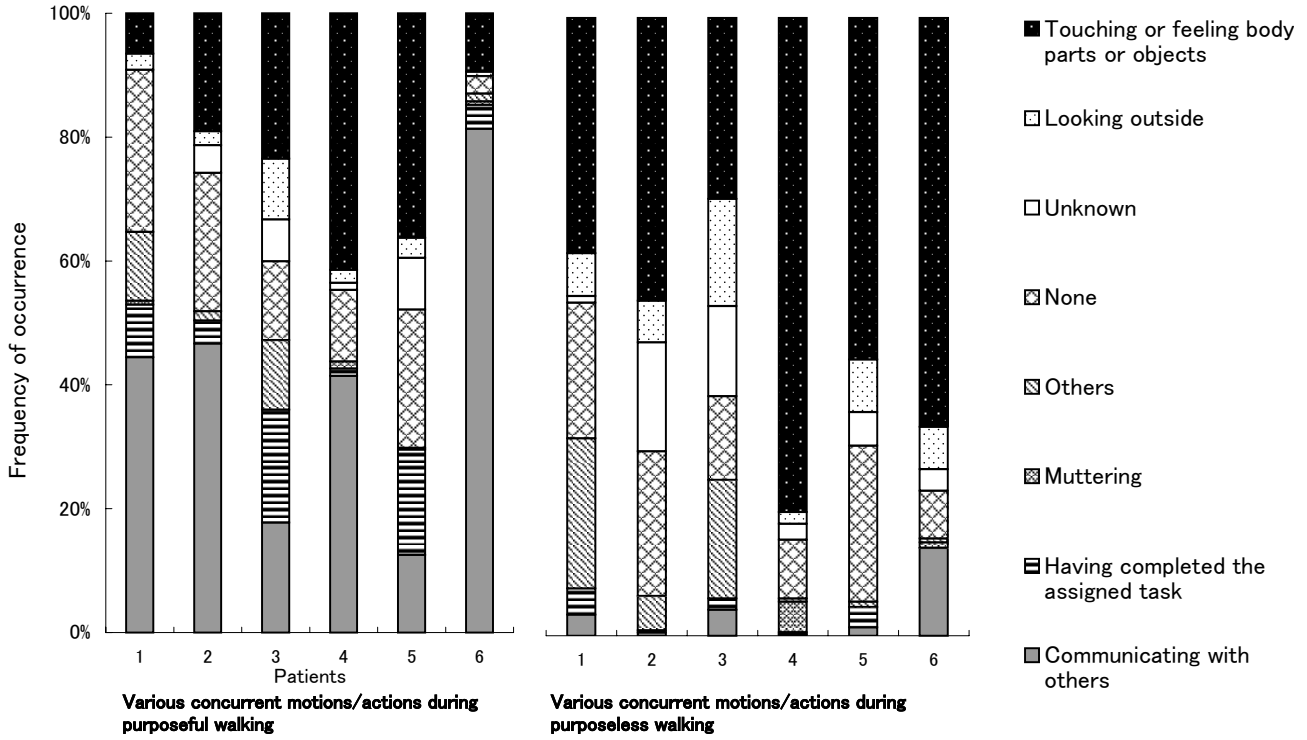

Figure 3. Frequency of the occurrence of various concurrent motions/actions during purposeful and purposeless walking in each patient

infrequently, that is, 0–13%, in all patients.

7. Comparison of concurrent motions/actions during purposeful and purposeless walking

The frequencies of the occurrence of various concurrent motions/actions (categories) during purposeful and purposeless walking were compared in each patient (Fig. 3). "Communicating with others" and "performing the assigned task" were observed more frequently during purposeful walking than during purposeless walking, but "touching or feeling body parts or objects" was observed more frequently during purposeless walking than during purposeful walking in all patients. "Looking outside" was also observed more frequently during purposeless walking in all patients except Patient 4.

Discussion

All patients in this study had episodes of nighttime wandering before admission. However, only 1 exhibited purposeless walking during the nighttime, whereas the remaining 5 engaged in it only during the daytime. In addition, while purposeless walking was often observed in the evening and nighttime in some patients, it was observed in all daytime zones in others, and the time of occurrence varied among patients. In Patient 2, who engaged in purposeless walking during the nighttime, the time between onset and admission was shorter than in other patients, and his scores on some items on the cognitive function tests were lower than the other patients. In a previous study of 10 dementia patients in caregiver facilities[13], nighttime wandering was reported in 3 patients; thus based on these two small studies of 16 patients in total, it is possible that nighttime wandering is not common in the facility environment. Dementia patients are usually admitted to facilities in the mid-to-late stages of dementia rather than in the early stages. Therefore, whether or not the patient exhibits nighttime wandering may be related to the time between onset and admission and to the severity of the dementia.

In this study, wandering alternated between "purposeless walking" and "standing," that is, it did not consist of continuous walking. The frequent interruption of walking suggests that

purposeless walking might change to other body position/locomotion categories, including standing. Such behavior may indicate the necessity of intervention for an underlying physical symptom. However, none of the patients in this study engaged in extreme wandering, often referred to as "typical wandering", the duration of which exceeds 50% of the patient's waking hours[14]. Therefore, these findings may only apply to patients who engage in "moderate wandering" or in those who are 3 or more years beyond the onset of dementia and who exhibit purposeless walking as a characteristic feature.

Relationships between activity categories and purposeless walking

Some relationships were noted between daily activities and purposeless walking in this study. Purposeless walking was unlikely to occur during meals, occupational therapy, and vital checks. However, it was likely to occur during free time and toileting. In addition, qualitative differences were observed in the characteristic motions/actions between purposeful and purposeless walking. During purposeless walking, patients characteristically touched their own bodies or one object after another that came within their reach or looked around. This suggests that the patients responded to situations in which they were expected by others to take some action, and that instructions by the staff and presentation of objects that indicate the staff's intention are effective for inducing appropriate responses. Lucero et al.[15] qualitatively analyzed 47-hour video records of 10 wanderers in caregiver facilities, and reported that wandering was often observed during periods without plans. They suggested the following causes of wandering: (1) prolongation of a period without plans, (2) lack of appropriate circumstances that would prompt actions, (3) lack of sensory stimulation, and (4) lack of opportunities for communication with the staff or other patients. The results of this study indicate that motions/actions concurrent with purposeful walking are characterized by "communicating with others" and "performing assigned tasks." This is considered to be a development of the above view of Lucero et al.[15] These differences in the occurrences of wandering that coincide with daily activities at facilities may be based on the impairment of cognitive function, which is a core symptom of DAT. Ozawa[16] explained dementia as a loss of the ability to notice the gap between "the action that one wants to take" and "the action that one can take", and to surmount it. He further suggested that associated symptoms occur due to this gap, and that care should consist of narrowing this gap and helping patients to live according to their remaining abilities. The results of our study indicate that the presence of a target object or intervention by the staff is useful for providing this kind of help. Further studies that include the evaluation of intervention methods concerning how such objects and human help can be used should be performed.

In terms of daily activities, there have been few studies in which activities were categorized in detail and related to purposeless walking. Therefore, the findings of the present study are considered important because they elucidate all patient characteristics that are observed outside of purposeful walking.

Analytical method for concurrent motions/actions

In this study, to understand patients who have difficulty verbally expressing themselves, we analyzed all motions/actions of patients in as great detail as possible, that is, we aimed to clarify motions/actions other than those captured as body position/locomotion categories. We expected it would be an effective measure to evaluate the rationale behind wandering. Past studies of wandering based on behavioral observation have used behavioral mapping[13,17] and the time in motion technique[14]. Using these methods, which make observation and analysis of behavior possible over a long period, the activity level, graded as walking, sitting, etc., can be evaluated, and the frequency, duration, and pattern of wandering can be classified on the basis of the measurement of particular aspects of the patients' motions/actions

selected in advance, such as the route of wandering. Although these methods are useful for studying wandering, they are ineffective for the analysis of all motions/actions of patients, which was the objective of this study. In this study, we introduced a new method that had not been applied in previous studies, that is, condensing the time during which activities of interest were performed. We showed that selected motions/actions could be analyzed using this method. However, further evaluation is necessary concerning the appropriateness of the degree of condensation and daily activities of interest. However, this study shows that analysis of a large volume of data from many patients, which might previously have been considered impossible, can be performed with no marked loss of precision.

Characteristics of the patients' motions/actions

By studying what the patients were doing aside from maintaining the body position and moving around, we classified these concurrent motions/actions into 8 categories including "looking outside", "touching or feeling body parts or objects", and "communicating with others". Similar results were obtained by the analysis of concurrent motions/actions during various daily activities and during walking. Wandering is often expressed as abnormal behavior. However, the characteristics of the motions/actions of patients observed in this study did not differ markedly when comparing periods of wandering with other periods of time. The patients selected motions/actions according to the daily activity and based on their abilities and they performed motions/actions according to their ability to make judgments.

The following emerged as characteristics of wandering

Wandering often consists of purposeless walking and standing, with these 2 actions alternating over a long period. The frequent use of the hands, including touching body parts and touching or feeling objects within reach, is observed during walking or standing. Because purposeless walking was closely related to free time among daily activities at facilities, we speculate that the patients' desire to be relieved from boredom or to do something was expressed as touching various objects within their reach, moving and touching their own bodies, or walking. Morris D[18] observed that people repeat stereotyped actions such as touching the body or objects within easy reach when they are nervous or bored, and that the cause of these stereotyped actions is boredom if such actions disappear, but nervousness if they increase. This same mechanism may account for the findings in the present study. Algase et al.[19] proposed that behavior recognized as problematic, such as wandering and restlessness, be called "need-driven dementia-compromised behavior" and aimed to analyze its causes. Based on results of this study, it is possible that wandering is a measure that patients use to cope with a desire to work or engage in some activity. It is possible that some form of occupational therapy or task based on a patient's abilities may be helpful in satisfying this desire for activity and may thus serve as an appropriate intervention for wandering.

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徘徊者はなぜ徘徊をするのか
－24時間の行動観察による6事例の徘徊行動の分析から－

菅野　圭子

要　　旨

施設入所中の徘徊のあるDAT 6 名の、通常と考えられる24時間をビデオ撮影した。撮影した24時間のデータを対象者の体位・移動の種類によって区分した。同様に、生活時間の種類によっても区分し、体位・移動区分との関連性を調べた。また体位・移動区分の「歩行」については目的の有無により「不明歩行」と「明瞭歩行」に分けた。次に体位・移動以外に行う動作・行為を並行動作・行為と仮称し、生活時間区分間および歩行時の並行動作・行為を分析した。最後に「不明歩行の連続」または「不明歩行と立位の連続」を徘徊とし、徘徊の実体と、徘徊直前の状況から徘徊発生に関連する背景を調べた。その結果、不明歩行の累積時間は平均１時間30分であったが、徘徊の累積時間は平均４時間と長く、徘徊は「不明歩行」と「立位」が繰り返されるものが多いことが示された。また不明歩行は自由時間で発生しやすく、作業療法時間や食事時間で発生しにくいなど生活時間区分と関連性がみられた。それぞれの生活時間区分における動作・行為特徴は、作業療法時間や食事時間では「与えられた課題をこなす」であり、自由時間では「身体・物を触る、いじる」または「なし」であった。歩行時の動作・行為特徴は、「不明歩行」で「身体・物を触る、いじる」、「明瞭歩行」で「他者と交流する」特徴が見られ、両者の動作・行為特徴に違いがあった。徘徊直前に影響を与えると考えられた因子は対象者の動作・行為で、対象者は「身体・物を触る、いじる」動作・行為をしていることが多かった。これらより、徘徊は対象者を取り巻く生活時間の退屈さを何とかしようとする対処行動である可能性が示唆された。